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Long Time Series of the Denmark Strait Overflow Reconstructed from Reservoir Height and Wind Stress Observations

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The Denmark Strait Overflow carries dense water from the Nordic Seas to the deep North Atlantic, and is thus an important part of the Atlantic Meridional Overturning Circulation. Multi-decadal time series are essential to understand the sensitivity of the overflow to climate variability.

Since 1996, the overflow has been continuously observed by bottom mounted Acoustic Doppler Current Profilers (ADCP) at the Denmark Strait Sill, giving first evidence for inter-annual and seasonal transport variability in the order of 30 % of the mean flow.

A comparison of the ADCP measurements with hydraulic control transport estimates based on upstream hydrographic data of the Marine Research Institute Reykjavik, and NCEP wind stress time series of the Iceland Sea region shows, that the dense water transport may in fact be reconstructed from upstream data.

Since the hydrographic data set extends further back in time than the direct ADCP observations, the Denmark Strait overflow transport is reconstructed for the past decades.